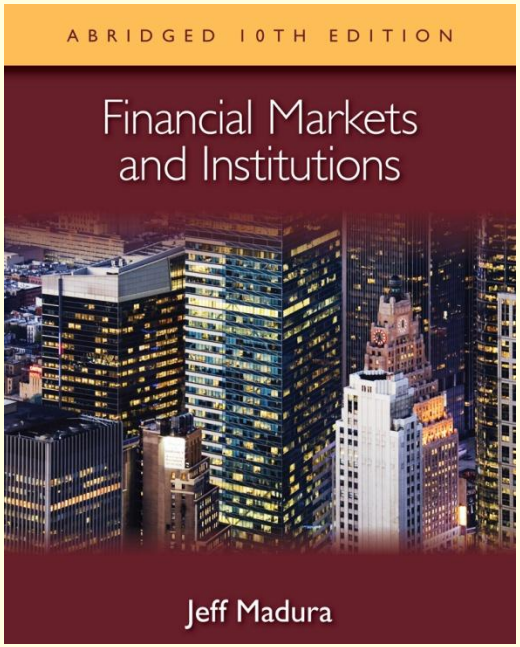
Financial Markets and Institutions

Abridged 10th Edition

by Jeff Madura



2 Determination of Interest Rates

Chapter Objectives

- apply the loanable funds theory to explain why interest rates change
- identify the most relevant factors that affect interest rate movements
- explain how to forecast interest rates

Loanable Funds Theory

1. **The Loanable Funds Theory** suggests that the market interest rate is determined by the factors that control supply of and demand for loanable funds.
2. Can be used to explain:
   a. Movements in the general level of interest rates in a particular country
   b. Why interest rates among debt securities of a given country vary.

Demand for Loanable Funds

1. **Household demand** for loanable funds
   a. Households demand loanable funds to finance housing expenditures as well as the purchase of automobiles and household items.
   b. Inverse relationship between the interest rate and the quantity of loanable funds demanded. (Exhibit 2.1)

Demand for Loanable Funds

2. **Business demand** for loanable funds

a. Depends on number of business projects to be implemented. More demand at lower interest rates. (Exhibit 2.2)

$$NPV = -INV + \sum_{t=1}^{n} \frac{CF_t}{(1+k)^t}$$

NPV = net present value of project

INV = initial investment

CF_t = cash flow in period t

k = required rate of return on project

Demand for Loanable Funds

3. **Government demand** for loanable funds

a. Governments demand loanable funds when planned expenditures are not covered by incoming revenues.

b. Government demand is said to be **interest inelastic**: insensitive to interest rates. Expenditures and tax policies are independent of the level of interest rates. (Exhibit 2.3)

Exhibit 2.1 Relationship between Interest Rates and Household Demand (Dh) for Loanable Funds at a Given Point in Time

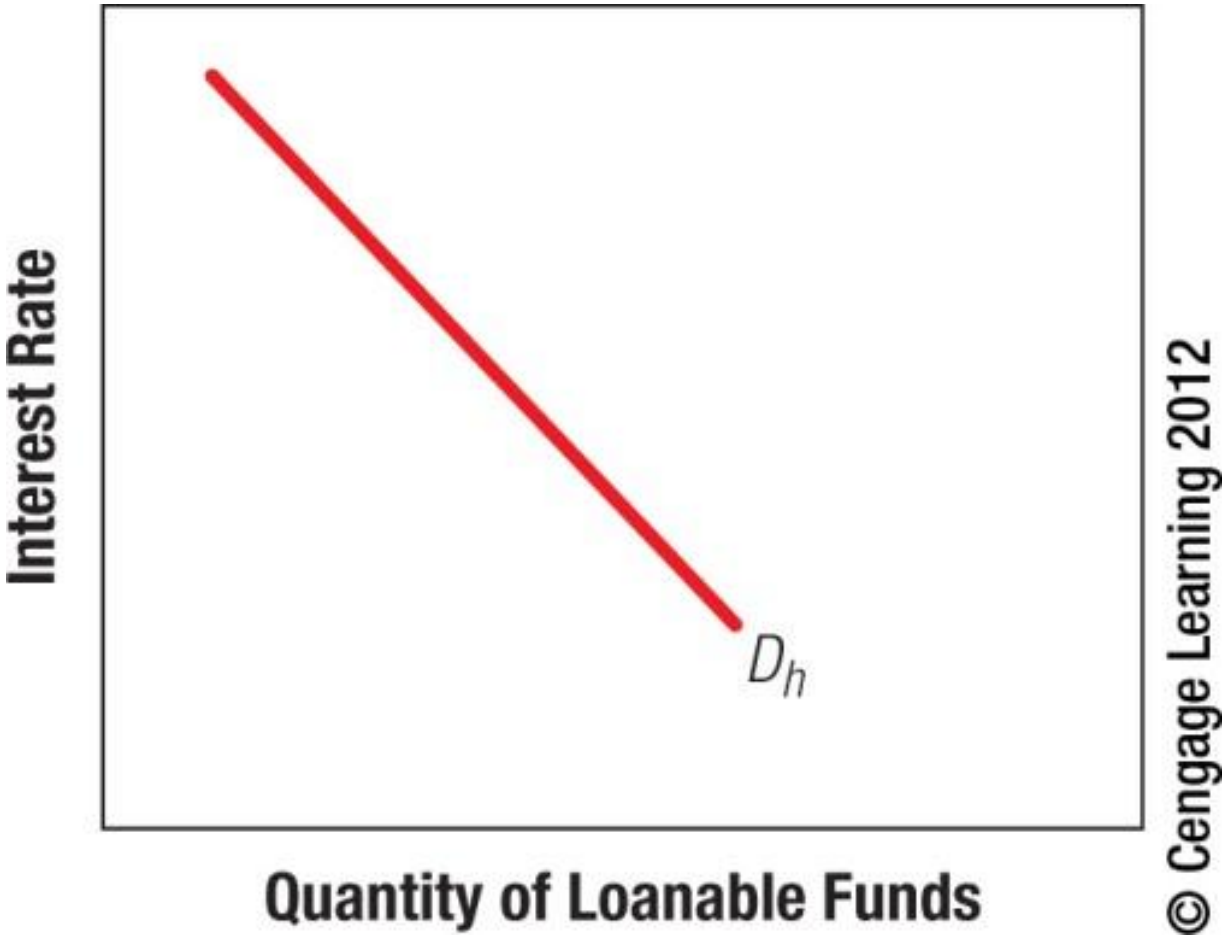


Exhibit 2.2 Relationship between Interest Rates and Business Demand (D_b) for Loanable Funds at a Given Point in Time

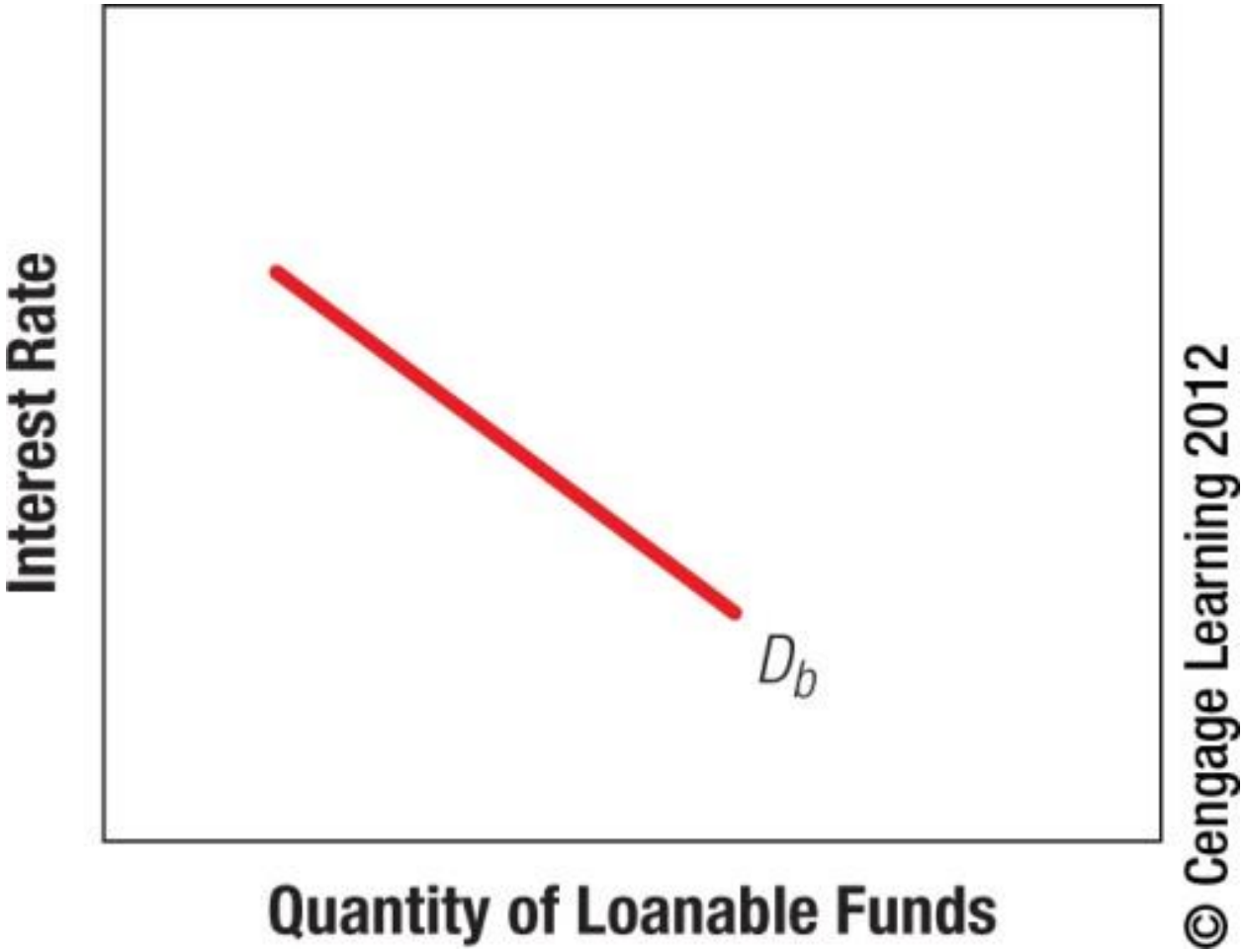
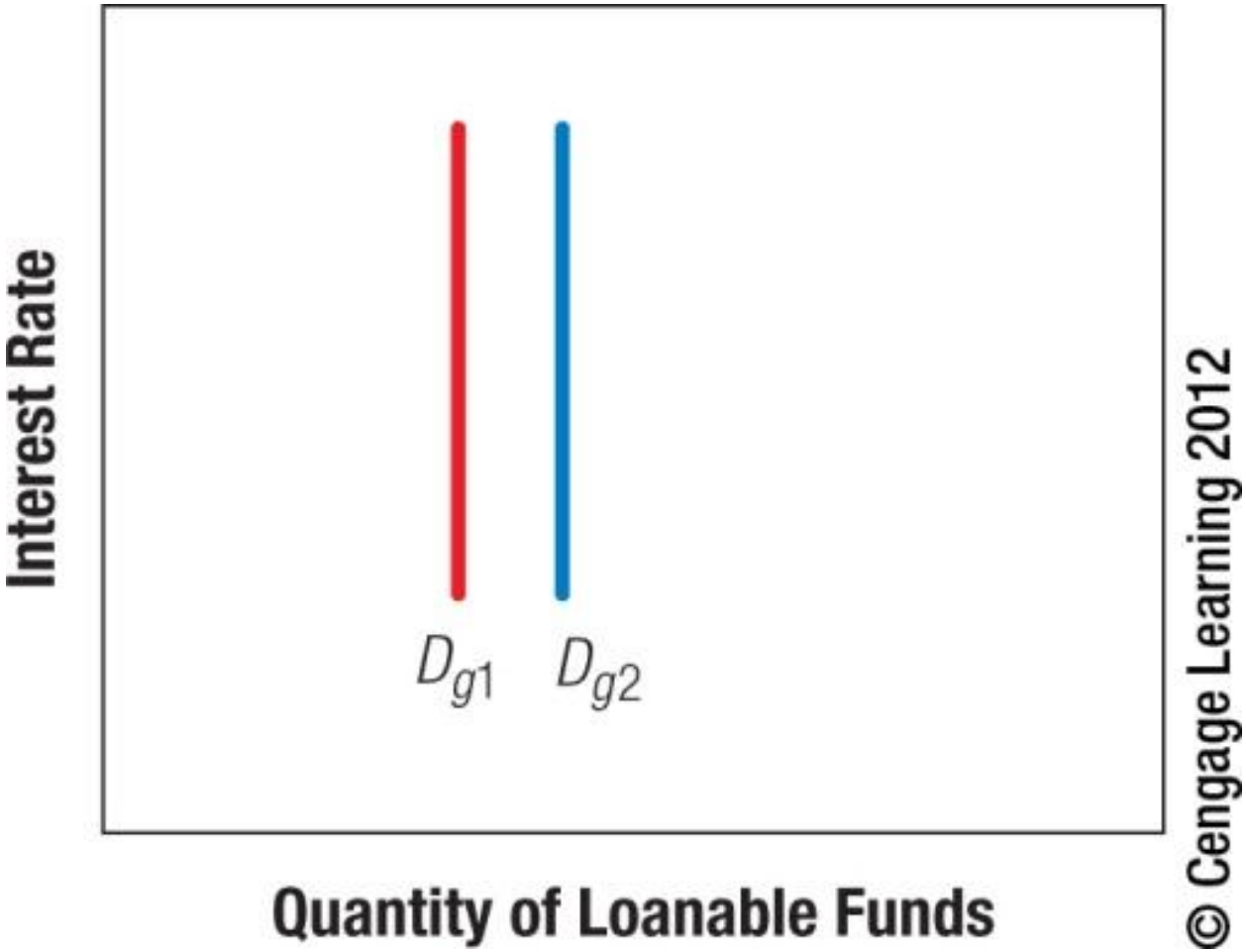


Exhibit 2.3 Impact of Increased Government Deficit on the Government Demand for Loanable Funds



Demand for Loanable Funds

4. **Foreign demand** for loanable funds
   a. A country's demand for foreign funds depends on the interest rate differential between the two.
   b. The greater the differential, the greater the demand for foreign funds.
   c. The quantity of U.S. loanable funds demanded by foreign governments will be inversely related to U.S. interest rates. (Exhibit 2.4)
5. **Aggregate demand** for loanable funds
   a. The sum of the quantities demanded by the separate sectors at any given interest rate. (Exhibit 2.5)

Exhibit 2.4 Impact of Increased Foreign Interest Rates on the Foreign Demand for U.S. Loanable Funds

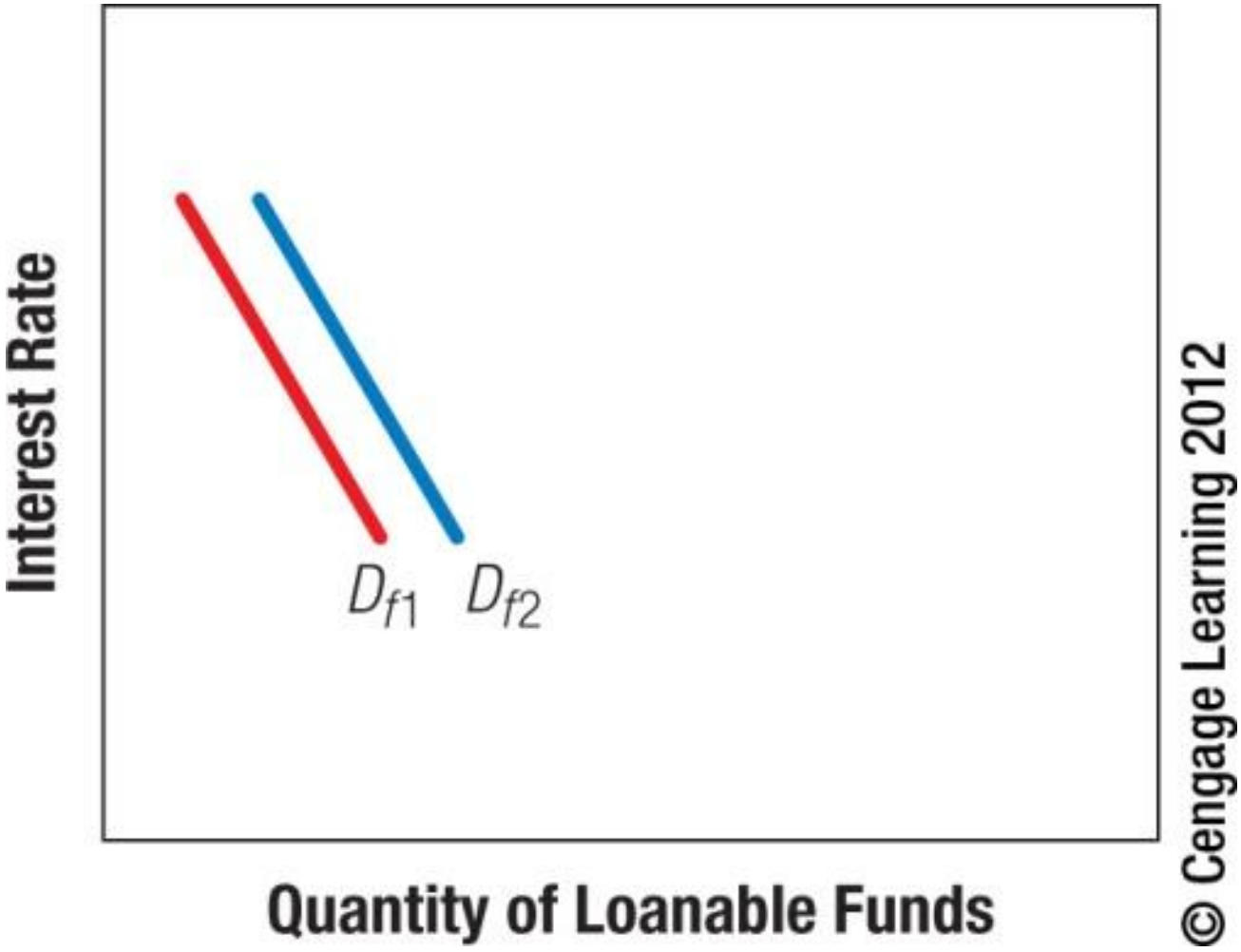
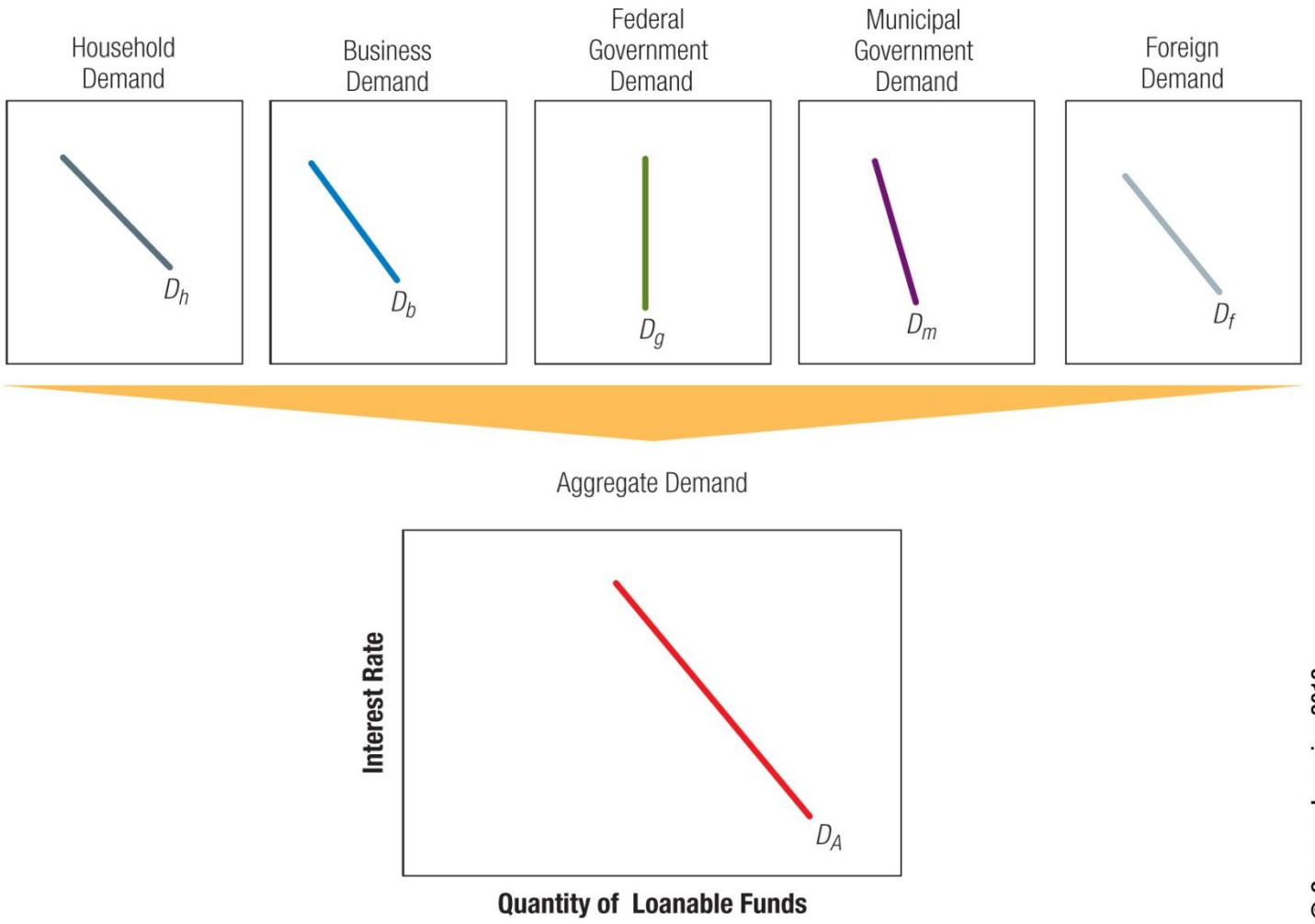


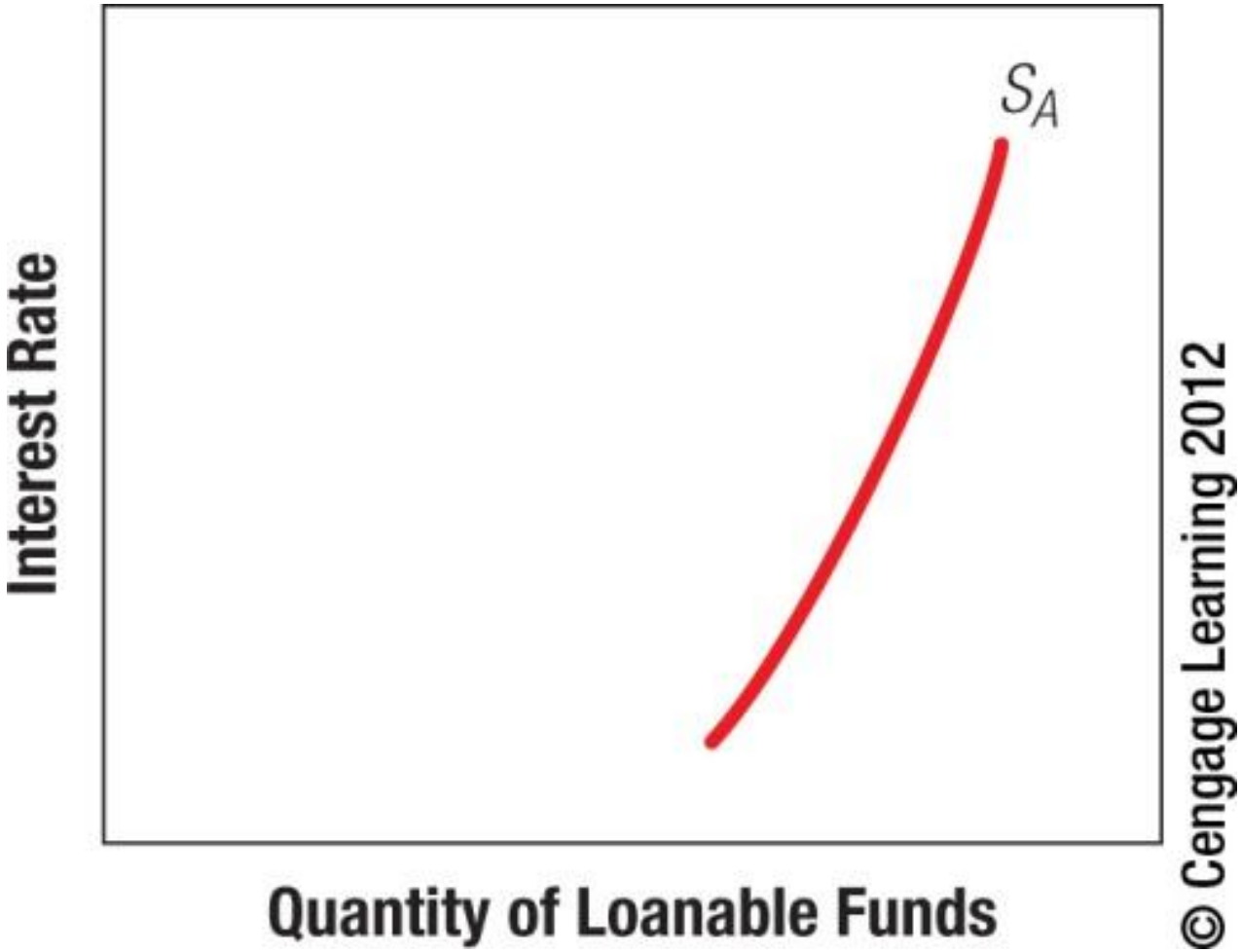
Exhibit 2.5 Determination of the Aggregate Demand Curve for Loanable Funds



Supply of Loanable Funds

1. **Households** are largest supplier, but some supplied by government units.
   a. More supply at higher interest rates.
   b. Supply by buying securities.
2. **Effects of the Fed** - By affecting the supply of loanable funds, the Fed's monetary policy affects interest rates.
3. **Aggregate supply of funds** –Is the combination of all sector supply schedules along with the supply of funds provided by the Fed's monetary policy. (Exhibit 2.6)

Exhibit 2.6 Aggregate Supply Curve for Loanable Funds



Equilibrium Interest Rate

1. **Aggregate Demand** for funds (D_A)

   $D_A = D_h + D_b + D_g + D_m + D_f$

   D_h = household demand for loanable funds

   D_b = business demand for loanable funds

   D_g = federal government demand for loanable funds

   D_m = municipal government demand for loanable funds

   D_f = foreign demand for loanable funds

2. **Aggregate Supply** of funds (S_A)

   $S_A = S_h + S_b + S_g + S_m + S_f$

   S_h = household supply for loanable funds

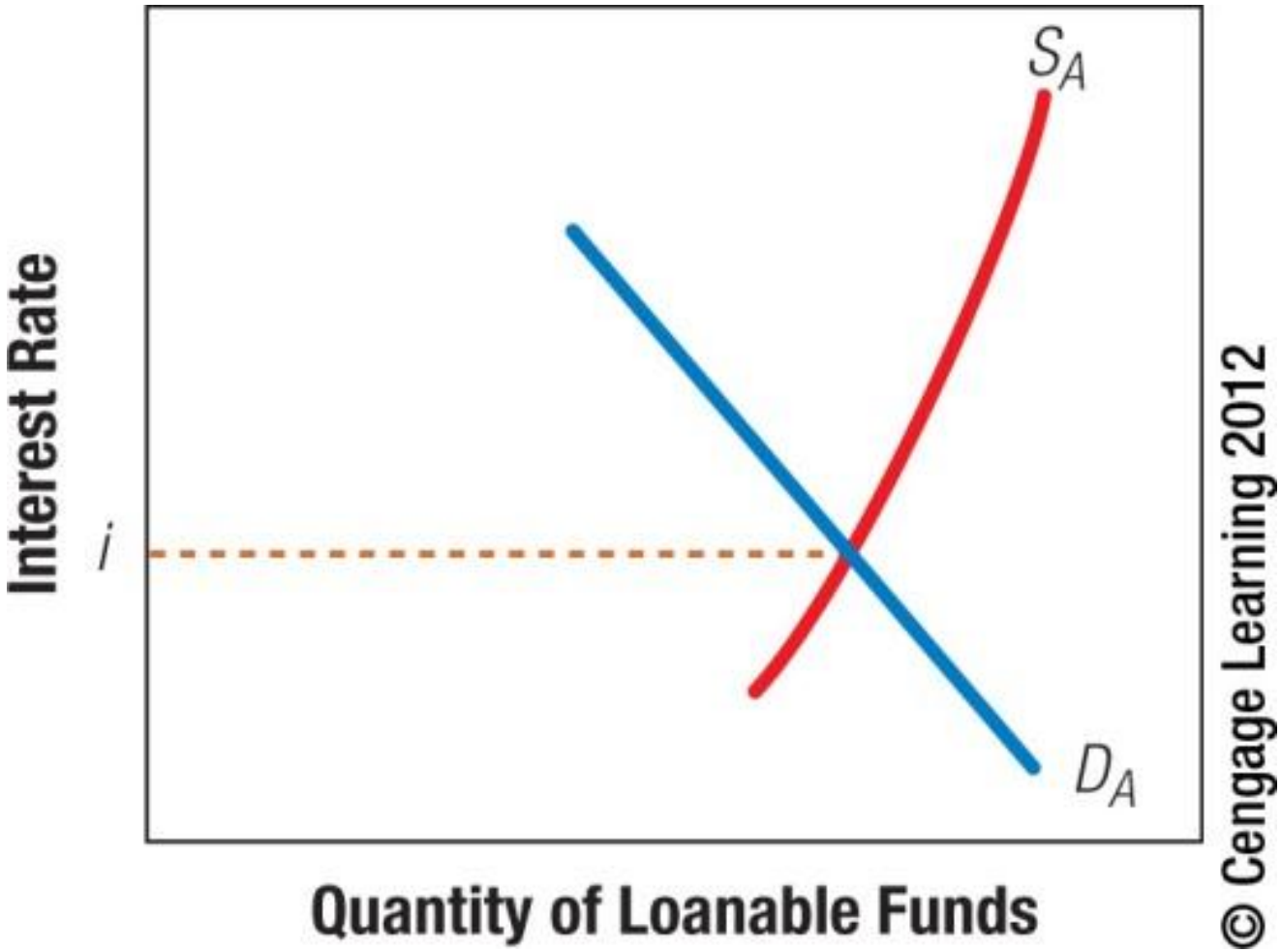
   S_b = business supply for loanable funds

   S_g = federal government supply for loanable funds

   S_m = municipal government supply for loanable funds

   S_f = foreign supply for loanable funds

Exhibit 2.7 Interest Rate Equilibrium



Factors That Affect Interest Rates

1. Impact of **economic growth** on interest rates:

   a. Puts upward pressure on interest rates by shifting demand for loanable funds outward. (Exhibits 2.8 & 2.9)

2. Impact of **inflation** on interest rates:

   a. Puts upward pressure on interest rates by shifting supply of funds inward and demand for funds outward. (Exhibit 2.10)

   b. Fisher effect: $i = E(INF) + i_R$

      where i = nominal or quoted rate of interest

      $E(INF)$ = expected inflation rate

      i_R = real interest rate

Exhibit 2.8 Impact of Increased Expansion by Firms

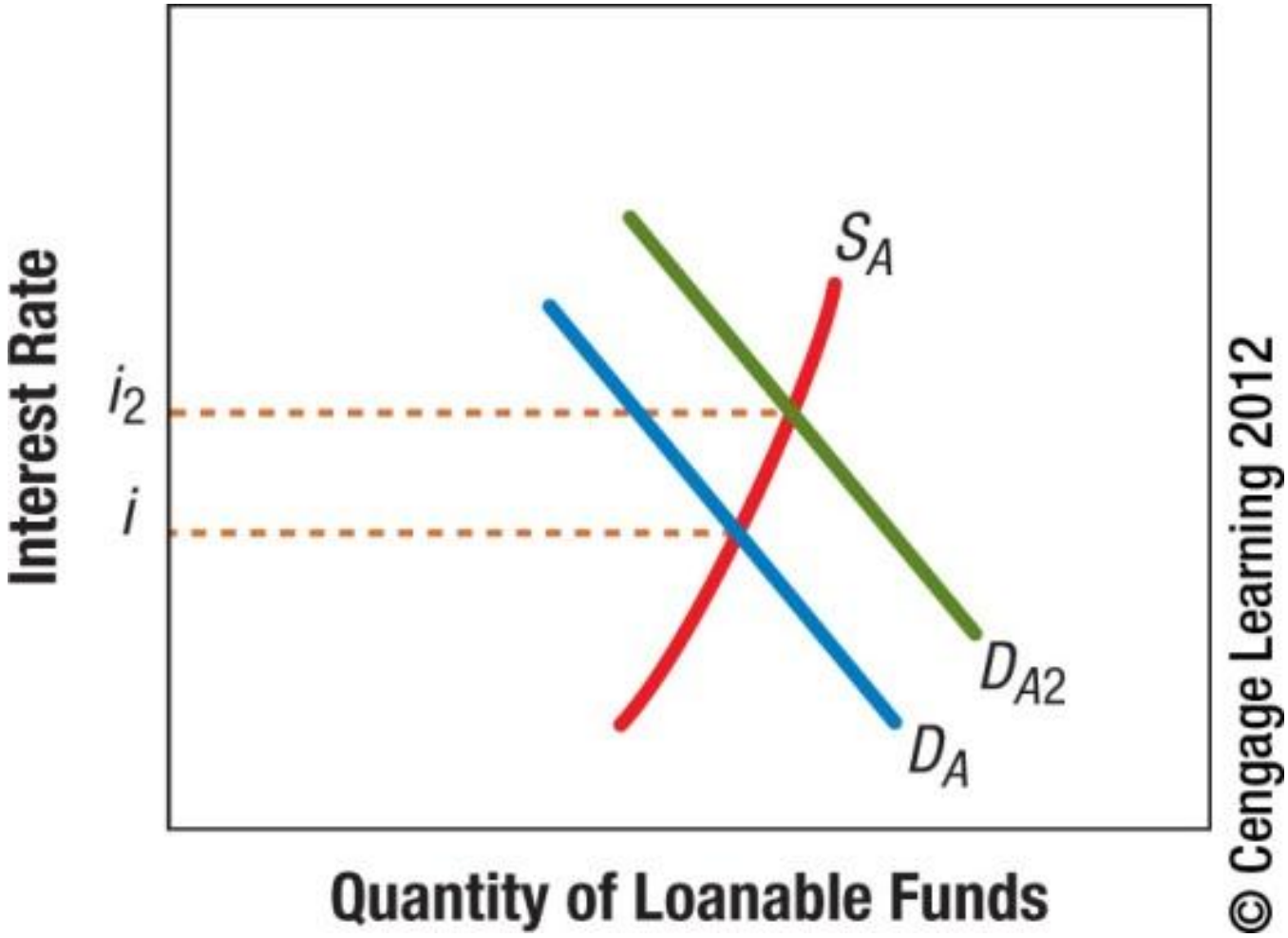


Exhibit 2.9 Impact of an Economic Slowdown

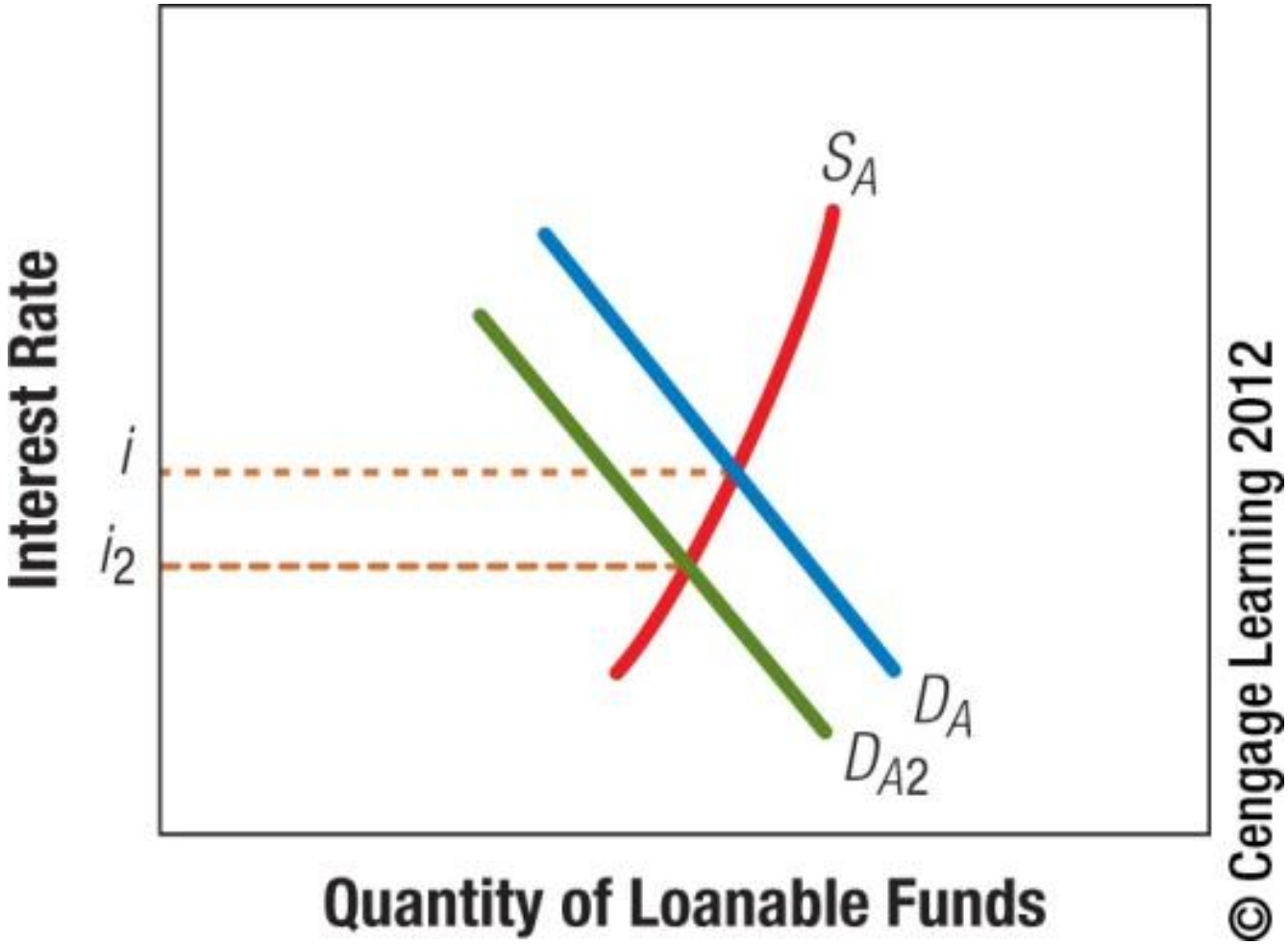
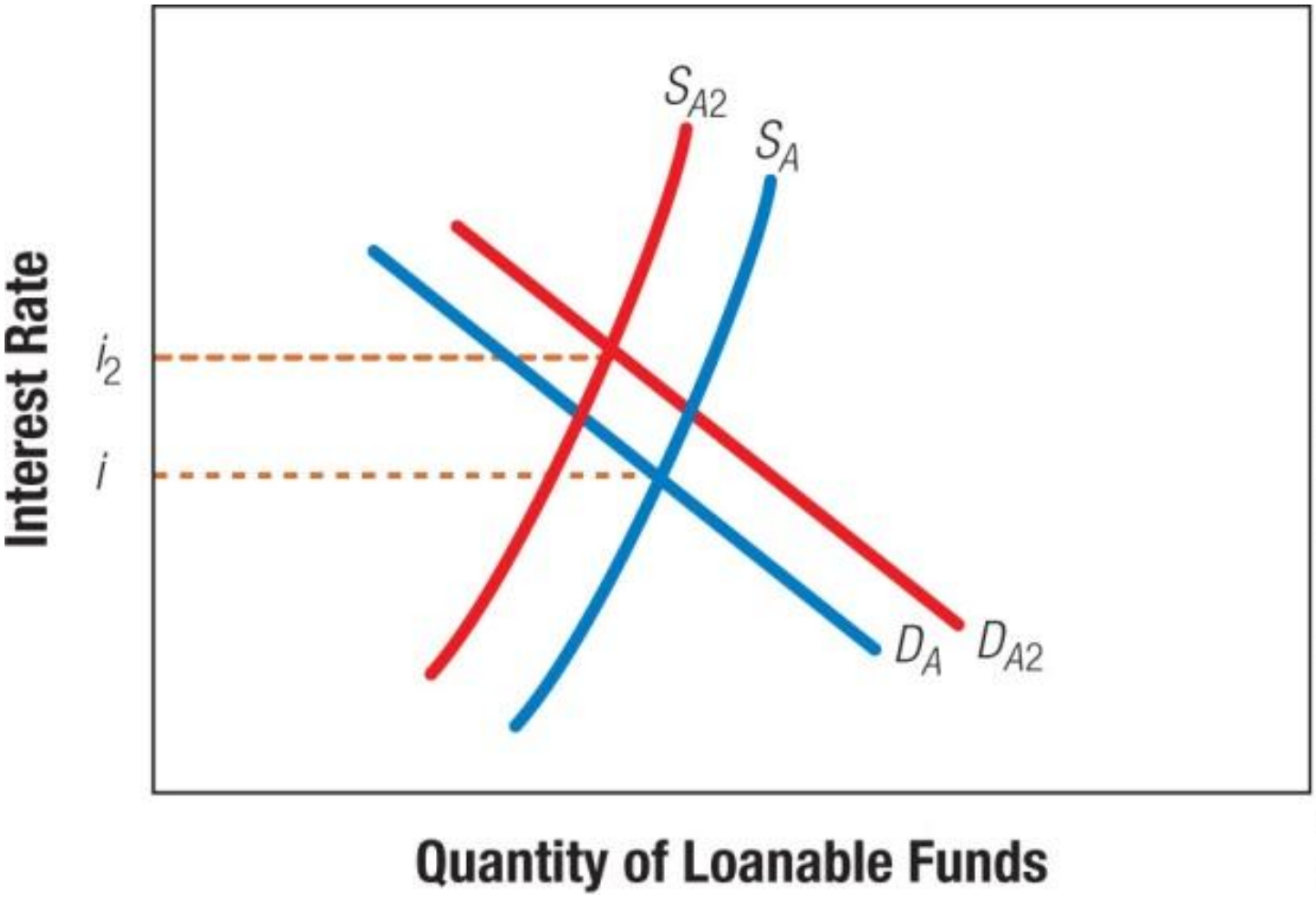


Exhibit 2.10 Impact of an Increase in Inflationary Expectations on Interest Rates



Factors that Affect Interest Rates

3. Impact of **Monetary Policy** on Interest Rates

When the Fed reduces (increases) the money supply, it reduces (increases) the supply of loanable funds, putting upward (downward) pressure on interest rates.

4. Impact of the **Budget Deficit** on Interest Rates

Crowding-out Effect: Given a certain amount of loanable funds supplied to the market, excessive government demand for funds tends to "crowd out" the private demand for funds. (Exhibit 2.11)

5. Impact of **Foreign Flows of Funds** on Interest Rates

Interest rate for a certain currency is determined by the demand for funds in that currency and the supply of funds available in that currency. (Exhibit 2.12)

Exhibit 2.11 Flow of Funds between the Federal Government and the Private Sector

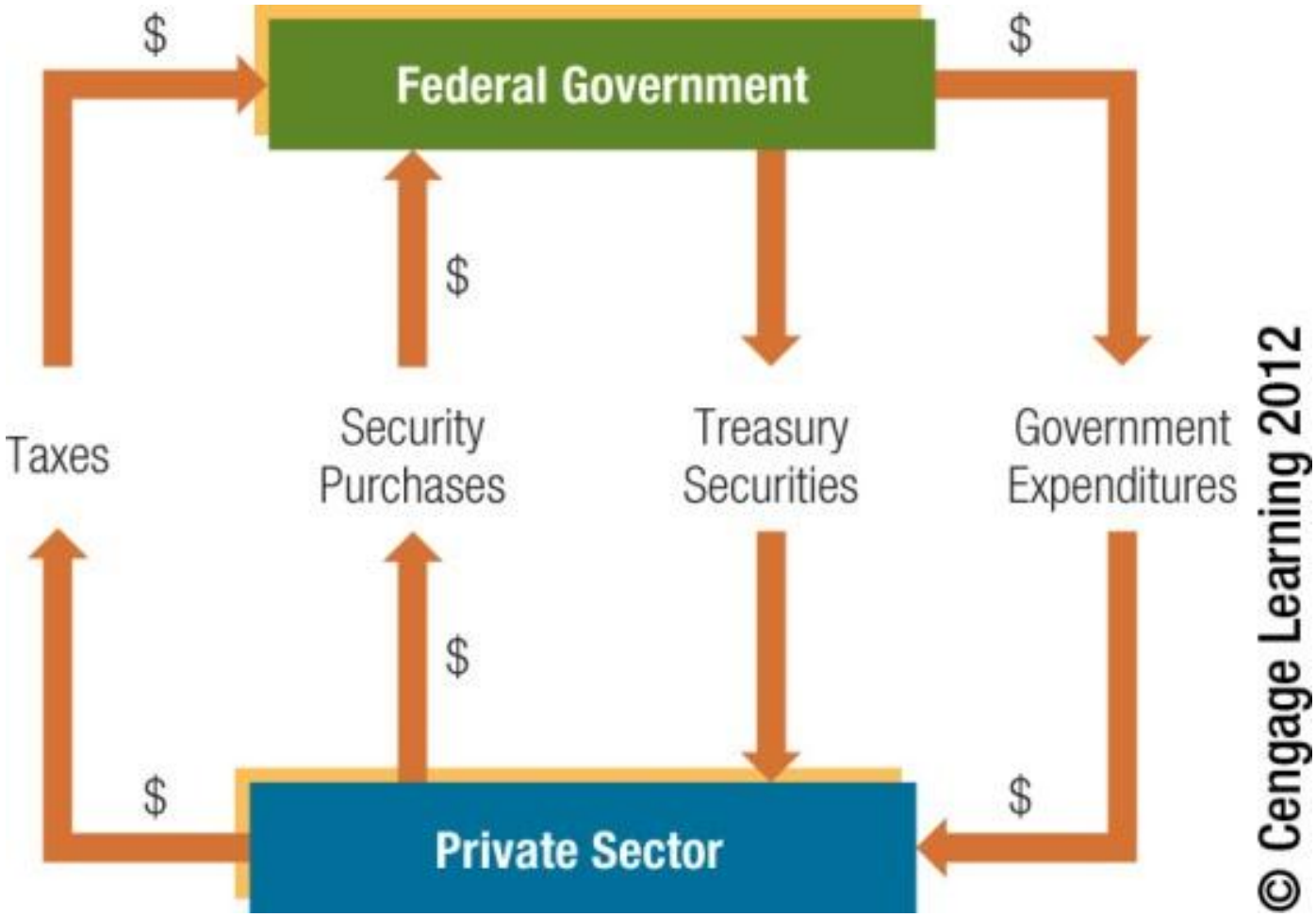
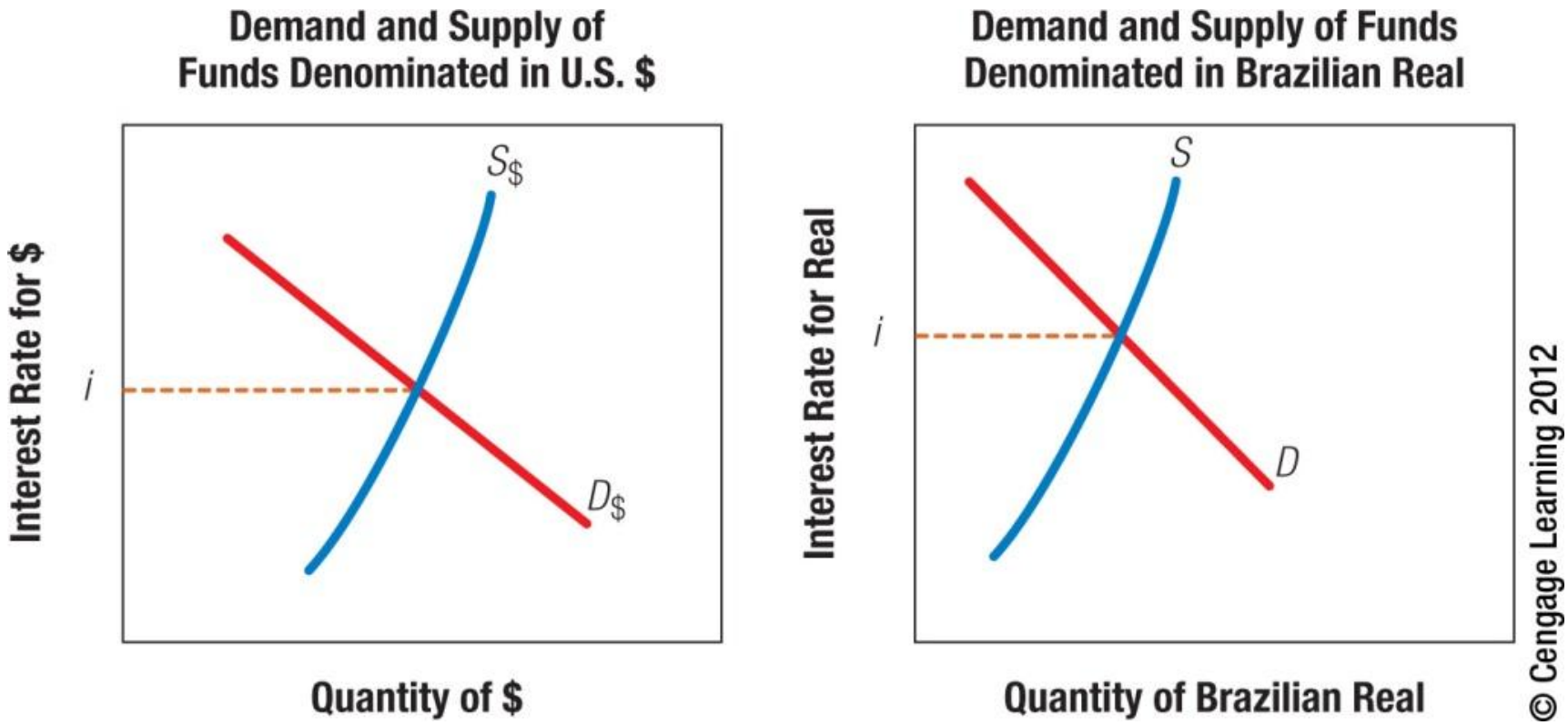


Exhibit 2.12 Demand and Supply Curves for Loanable Funds Denominated in U.S. Dollars and Brazilian Real



Summary of Forces that Affect Interest Rates

1. **Economic conditions** are the primary forces behind a change in the supply of savings provided by households or a change in the demand for funds by households, businesses, or the government.

2. The demand for funds in the United States is indirectly affected by U.S. monetary and fiscal policies because these policies influence economic growth and inflation, which in turn affect business demand for funds. Fiscal policy determines the budget deficit and therefore determines the federal government demand for funds. (Exhibit 2.13)

Exhibit 2.13 Interest Rate Movements Over Time

Forecasting Interest Rates

1. Net Demand (ND) should be forecast:

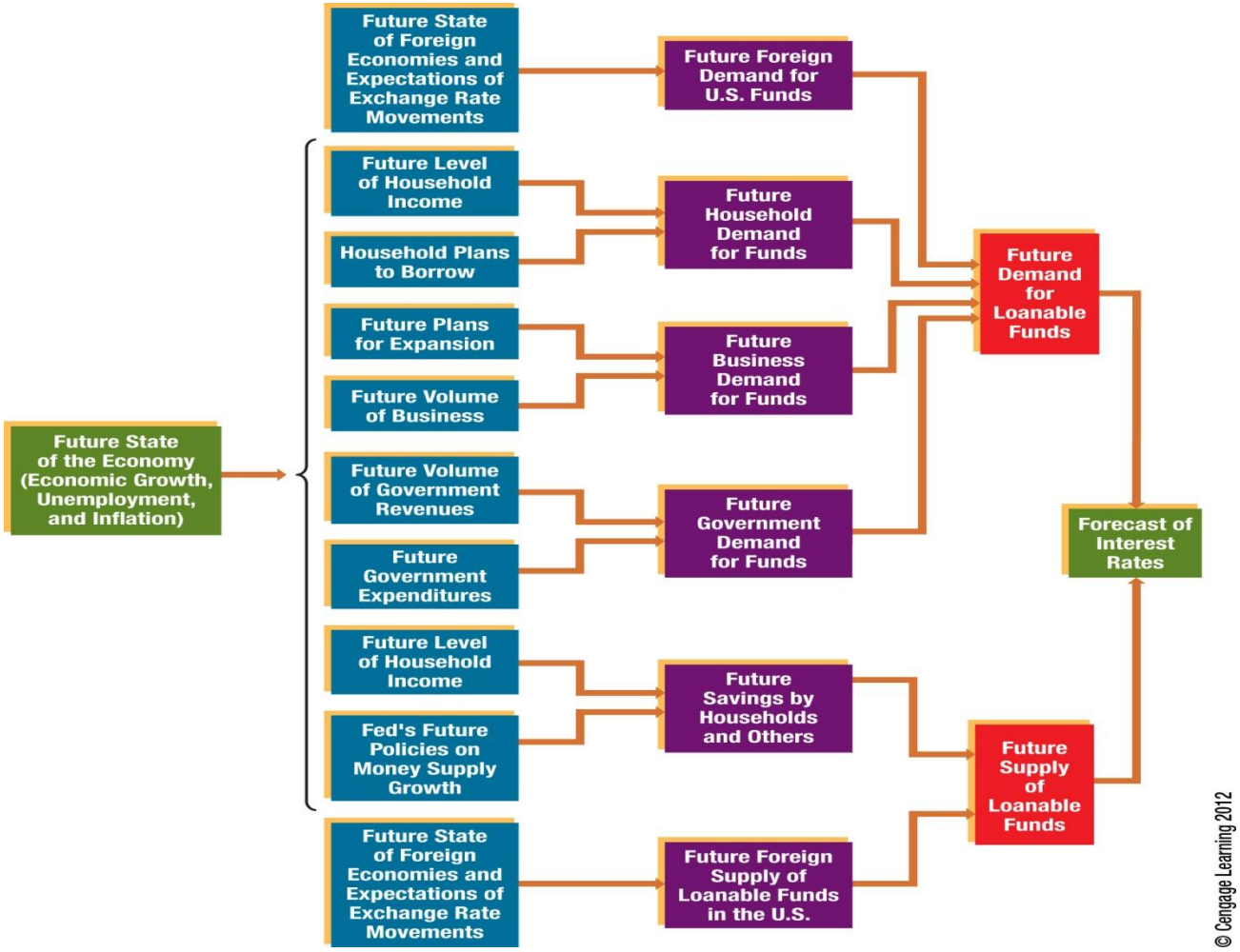
$$ND = D_A - S_A$$

$$ND = (D_h + D_b + D_{,m} + D_r) - (S_h + S_b + S_m + S_f)$$

2. Future Demand for Loanable Funds depends on future
   a. Foreign demand for U.S. funds
   b. Household demand for funds
   c. Business demand for funds
   d. Government demand for funds

3. Future Supply of Loanable Funds depends on:
   a. Future supply by households and others
   b. Future foreign supply of loanable funds in the U.S.

Exhibit 2.14 Framework for Forecasting Interest Rates



SUMMARY

- The loanable funds framework shows how the equilibrium interest rate depends on the aggregate supply of available funds and the aggregate demand for funds. As conditions cause the aggregate supply or demand schedules to change, interest rates gravitate toward a new equilibrium.
- Given that the equilibrium interest rate is determined by supply and demand conditions, changes in the interest rate can be forecasted by forecasting changes in the supply of and the demand for loanable funds. Thus, the factors that influence the supply of funds and the demand for funds must be forecast in order to forecast interest rates.

SUMMARY

- The relevant factors that affect interest rate movements include changes in economic growth, inflation, the budget deficit, foreign interest rates, and the money supply. These factors can have a strong impact on the aggregate supply of funds and/or the aggregate demand for funds and can thereby affect the equilibrium interest rate. In particular, economic growth has a strong influence on the demand for loanable funds, and changes in the money supply have a strong impact on the supply of loanable funds.